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SUBRAMANIAN, NARAYANSWAMY	
ART UNIT	PAPER NUMBER
3691	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/870,387	EVERTSZ ET AL.	
	Examiner	Art Unit	
	Narayanswamy Subramanian	3691	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 23-28* is/are pending in the application.

4a) Of the above claim(s) *8,9,14,15,17,18 and 20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7, 10-13, 16, 19 and 23-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to applicants' communication filed on December 26, 2007. Amendments to claims 1-7, 10-11, 13, 16, 19-20, 23, 25, and 28 and cancellation of claim 29 have been entered. Rejection of claims 23-25 under 35 U.S.C. § 112, second paragraph are withdrawn in view of the amendments. Claims 1-20, 23-28 are currently pending of which claims 8, 9, 14, 15, 17 18 and 20 as being drawn to a non-elected specie. Claims 1-7, 10-13, 16, 19 and 23-28 have been examined. The rejections and response to arguments are stated below.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-7, 10-13, 16, 19 and 23-28 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory Subject matter.

35 USC 101 requires that in order to be patentable the invention must be a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof" (emphasis added).

Claims 1-7, 10-13, 16, 19 and 23-28 are drawn to "a method, a system and a computer program product for displaying of real world data by displaying a plurality of points in a phase space" and to "a method for displaying of financial data in a phase space". As such the claimed invention is directed to a judicial exception to 35 U.S.C. 101 (i.e., an abstract idea, natural phenomenon, or law of nature) and is not directed to a practical application of such judicial

exception because the claims do not require any physical transformation and the invention as claimed does not produce a useful, concrete, and tangible result.

The Court of Appeals for the Federal Circuit issued opinions in State Street Bank & Trust Co. v. Signature Financial Group Inc., 149 F. 3d 1368, 47 USPQ2d 1596 (Fed. Cir. 1998) and AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999). These decisions explained that, to be eligible for patent protection, the claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601 02. To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways: (a) The claimed invention "transforms" an article or physical object to a different state or thing. (b) The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

The USPTO's official interpretation of the utility requirement provides that the utility of an invention has to be (i) specific, (ii) substantial and (iii) credible. See MPEP § 2107. It is not clear as to what is the utility of computing and displaying a point in space. The utility of the claimed invention is not specific, substantial and credible. It is not clear as to what is the specific, substantial and credible utility of "providing as an output of the electronic processor a display of the point(s) in phase space" or "enabling displaying of the sub-space on the medium selected".

The tangible requirement does require that the claim must recite more than a § 101 judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application"). It is not clear as to

what is the practical application of "providing as an output of the electronic processor a display of the point in phase space" or "enabling displaying of the sub-space on the medium selected".

For an invention to produce a "concrete" result, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. In re Swartz, 232 F.3d 862, 864, 56 USPQ2d 1703, 1704 (Fed. Cir. 2000) (where asserted result produced by the claimed invention is "irreproducible" claim should be rejected under section 101). The opposite of "concrete" is unrepeatable or unpredictable.

There is no useful, concrete and tangible result produced from implementing the steps of the claimed invention. The dependent claims are rejected for the same reason and by way of dependency on a rejected independent claim.

The claims 1-7, 10-13, 16, 19 and 23-28 recite a non-statutory process.

The instant claims recite mathematical algorithm which solve a problem of displaying of real world data by displaying a plurality of points in a phase space (as recited in the claims 1-7, 10-13, 16, 19 and 23-29) A mathematical algorithm is defined as a "procedure for solving a given type of mathematical problem." *Gottschalk v. Benson*, 409 U.S. 63, 65, 175 USPQ 673, 674 (1972); *Flook*, 437 U.S. at 585 n.1. 198 USPQ at 195 n.1: Diehr, 450 U.S. at 186, 209 USPQ at 8. **Mathematical algorithms are non- statutory because they have been determined not to fall within the § 101 statutory class of a "process."** *Benson.* "[A]n algorithm, or mathematical formula, is like a law of nature, which cannot be the subject of a patent." *Diehr,* 450 U.S. at 186, 209 USPQ at 8. The exception applies only to mathematical algorithms since any process is an " algorithm" in the sense that it is a step-by-step procedure to arrive at a given result. *In re Walter*,

618 F.2d 758, 764 n.4, 205 USPQ 397, 405 n.4, (CCPA 1980); *Pardo,* 684 F.2d at 915, 214 USPQ at 676.

A mathematical algorithm is not made statutory by "attempting to limit the use of the formula to a particular technological environment." *Diehr*, 450 U.S. at 191, 209 USPQ at 10. Thus, "field of use" or "end use" limitations in the claim preamble are insufficient to constitute a statutory process. This is consistent with the usual treatment of preambles as merely setting forth the environment. See *Flook* (the preamble while limiting the application of the claimed method to "a process comprising the catalytic chemical conversion of hydrocarbons" did not serve to render the method statutory); Walter, 618 F.2d at 769, 205 USPQ at 409 ("Although the claim preambles relate the claimed invention to the art of seismic prospecting, the claims themselves are not drawn to methods of or apparatus for seismic prospecting"); *de Castelet*, 562 F.2d at 1244 n.6. 195 USPQ at 446 n.6 ("The potential for misconstruction of preamble language requires that compelling reason exist before that language may be given weight"). Compare *Waldbaum*, 559 F.2d at 616 n.6. 194 USPQ 469 n.6 (portion of preambles referred to in method portion of claims "are necessary for completeness of the claims and are proper limitations thereto").

Data-gathering steps

If the only limitations in the claims in addition to the mathematical algorithm are data-gathering steps which "merely determine values for the variables used in the mathematical formulae used in making the calculations." Such antecedent steps are insufficient to change a nonstatutory method of calculation into a statutory process. See *In re Richman*, 563 F.2d at 1030. 195 USPQ at 343; *Sarkar,* 588 F.2d at 1335. 200 USPQ at 139 ("If the steps of gathering and

substituting values were alone sufficient, every mathematical equation, formula, or algorithm having any practical use would be per se subject to patenting as a 'process' under §101"): *Gelnovatch*, 595 F.2d at 41 n.7. 201 USPQ at 145 n.7.

The claimed inventions recite data gathering step (providing values for variables, calculating values of dependent variables, storing the calculated dependent variables and displaying points in space). When viewed in light of the specification, this step constitutes data gathering. As per the court rulings cited above, the claims constitute mathematical algorithm(s) applied to data gathered in the respective process steps. The fact that a mathematical algorithm is applied to solve a problem of displaying points in space does not make the claim statutory. *Walter,* 618 F.2d at 764-65 n.4, 205 USPQ at 405 n.4. "The type of mathematical computation involved does not determine whether a procedure is statutory or nonstatutory." *In re Gelnovatch*, 595 F.2d 32, 41.201 USPQ 136, 145 (CCPA 1979). A "claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under §101." *Flook*, 437 U.S. at 595 n.18, 198 USPQ at 199 n.18. Mathematical algorithms may represent scientific principles, laws of nature, or ideas or mental processes for solving complex problems. See *Meyer*, 688 F.2d at 794-95, 215 USPQ at 197. The system claims are rejected based on similar reasoning because the underlying process is non-statutory.

The dependent claims are rejected for the same reason and by way of dependency on rejected independent claims.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

5. Claims 1-7, 10-13, 16, 19 and 23-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims recites the limitation "determining and storing with the electronic processor a first and a second coordinate value of a point in phase space based on the volatility and the net change". However it is not clear if the first coordinate value is based on volatility or scaled volatility. If it is based on unscaled volatility, it is not clear what is the purpose of scaling the volatility. Dependent claims are rejected by way of dependency on rejected independent claim. Appropriate correction/clarification is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-7, 10-13, 16, 19 and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart (US Patent 6,195,103 B1)

Claims 1, 23 and 25, Stewart teaches a method, system and a computer program product for displaying of real world data by displaying a plurality of points in a phase space, the method comprising the steps of, for each point: providing a sequence of data samples corresponding to the real world data measured in relation to a dimension (See Column 3 line 32 – Column 6 line 45, for instance time series data of a financial instrument); calculating and storing with an

electronic processor a single volatility of the sequence (See Column 3 line 32 – Column 6 line 45, computing the distance implies this feature); scaling and storing with the electronic processor the volatility with a factor, the factor being dependent on the length of the first sequence (See Column 3 line 32 – Column 6 line 45, multiplying distance by scale factor, for instance in the computation of the standard deviation the factor is dependent on the length of the sequence); calculating and storing with the electronic processor a net change in the data as a difference between data samples within the sequence, in accordance with the formula stated in the claim (See Column 6 lines 54-65, the disclosed by Stewart is the same as the one stated by the applicant). A system for performing these steps and a computer program product for use on a client computer are inherent in the disclosure.

Stewart does not explicitly teach the formulas used in the calculating step and the steps of determining and storing with the electronic processor a first and a second coordinate value of a point in phase space based on the volatility and the net change; and providing as an output of the electronic processor a display of the point in phase space.

Official notice is taken that these steps are old and well known in the financial art. The formulas recited in the claims are old and well known formulas for computing the variance and mean values of a sequence in continuous time. For instance computing the expected return and variance of a security and plotting in the mean-variance space has been in vogue at least for the last three decades. This plot helps in the selection of securities according one's risk-return preferences.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Stewart to include this feature. The combination suggests that users would have benefited from selecting a security according to their risk-return preferences.

Claim 28, Stewart teaches a method for displaying of financial data in a phase space, the method comprising the steps of: (a) providing a plurality of sequences of data samples, each corresponding to the financial data over time (See Column 3 line 32 – Column 6 line 45, for instance time series data of a financial instrument), and for each of said at least one sequences: (i) calculating a single volatility of the sequence; (ii) scaling the volatility with a factor, the factor being dependent on the length of the sequence (See Column 3 line 32 – Column 6 line 45, multiplying distance by scale factor, for instance in the computation of the standard deviation the factor is dependent on the length of the sequence); (iii) calculating return as a difference between data samples within the sequence, in accordance with the formula stated in the claim (See Column 6 lines 54-65, the disclosed by Stewart is the same as the one stated by the applicant).

Stewart does not explicitly teach the formulas used in the calculating step and the steps of (iv) determining a first and a second coordinate value of a point in phase space based on the volatility and the return; and (v) displaying the point in phase space using a medium selected from the group consisting of: computer display, printed media; and (c) for a plurality of said plurality of sequences of step (b): (i) calculating a probability distribution of the calculated return values; (ii) providing a probability threshold value; and (iii) defining a sub-space of the phase space based on the probability distribution and the probability threshold value; and (iv) enabling the visualization of the sub-space on the medium selected.

Official notice is taken that these steps are old and well known in the financial art. The formulas recited in the claims are old and well known formulas for computing the variance and mean values of a sequence in continuous time. For instance computing the expected return and variance of a security and plotting in the mean-variance space has been in vogue at least for the last three decades. This plot helps in the selection of securities according one's risk-return preferences. Computing a probability distribution of the calculated return values using the expected return and variance/standard deviation and plotting them is old and well known in the art of Finance and Statistics. This plot enables one understand the variability of the returns and helps in making informed decisions.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Stewart to include this feature. The combination suggests that users would have benefited from selecting a security according to their risk-return preferences and make informed decisions based on their understanding of the variability of the returns.

Claims 2-7, 10-13, 16, 19, 24, and 26-27, the features in these claims are either disclosed by Stewart or are old and well known. The inclusion of these features would help make the computation more robust and efficient.

Response to Arguments

8. In response to Applicant's arguments "Applicants have amended the claims to more particularly specify "A computer implemented method for displaying...", which clearly shows that the presently claimed invention produces a tangible result", the examiner respectfully disagrees. The final step of the independent claims recite "providing as an output of the electronic processor a display of the point in phase space" or "enabling the displaying of the sub-

space on the medium selected". It is not clear as to what is the utility of the display of the point or the sub-space. As discussed in the rejection above there is no useful, concrete and tangible result produced from implementing the steps of the claimed invention. Computerizing a method that is not statutory does not make the computerized method statutory. In *State Street* the useful, concrete and tangible result is the price of the security, which could be used in making trading decisions. However in the applicant's claimed invention it is not clear as to what is the utility of the display of the point or the sub-space.

Applicant's other arguments with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Narayanswamy Subramanian whose telephone number is (571) 272-6751. The examiner can normally be reached Monday-Thursday from 8:30 AM to 7:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Kalinowski can be reached at (571) 272-6771. The fax number for Formal or Official faxes and Draft to the Patent Office is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PMR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Narayanswamy Subramanian/
Primary Examiner
Art Unit 3691

January 22, 2008